

CLAIMS

1. An adaptive vehicle locking system comprising:
a plurality of vehicle door locks, each configured to lock and
5 unlock in response to a first type of signal;
a plurality of sensors each configured to sense opening and
closing of an associated vehicle door and to send second signals in response
to opening and closing of the associated vehicle door;
a lock requester configured to send a third signal; and
10 a control module configured to receive the second signals from
the plurality of sensors and the third signal from the lock requester, the
control module comprising a memory for storing a history of the second
signals and a timer adaptively settable in response to the history of the
second signals, the control module configured to send a first type signal to
15 the plurality of vehicle door locks causing the vehicle door locks to lock in
response to timing out of the timer following receipt of the third signal.

2. The locking system of claim 1 wherein the lock requester
comprises a lock request mechanism selected from the group consisting of a
power door lock, a wireless transmitter, a mobile phone, and a key.

3. A method for adaptively actuating a vehicle locking system
for locking the doors of a vehicle, the method comprising the steps of:
setting a timer to an adaptive door lock delay time in response to
a history of vehicle door openings and closings;
5 initiating a door lock request;
monitoring door opening status;
starting the timer in response to the door lock request and door
opening status; and
locking the doors of the vehicle at the expiration of the delay
10 time.

4. The method of claim 3 wherein the step of setting a timer comprises the steps of:
- setting the timer to a first delay time; and
 - modifying the delay time in response to a pattern of vehicle door
- 5 openings and closings following the door lock request.
5. The method of claim 4 wherein the step of modifying comprises the steps of:
- storing a history of vehicle door openings and closings including a pattern of door openings and the delay between opening and closing of each
- 5 door opened; and
- further modifying the time delay in response to a change in the stored history.
6. The method of claim 5 wherein the step of further modifying comprises the steps of:
- increasing the time delay if a door is opened before the end of the time delay but within a predetermined percentage of the time delay; and
- 5 decreasing the time delay if a door is opened before a predetermined percentage of the time delay.
7. The method of claim 5 further comprising the step of storing the change in stored history and the modified time delay.
8. The method of claim 3 further comprising the step of adding an increment of time to the adaptive door lock delay time following an unlock request within a predetermined length of time after the step of locking the doors.

9. The method of claim 3 wherein the step of initiating a door lock request comprises the steps of:
- opening at least one door of the vehicle;
 - activating a lock request mechanism; and
 - 5 closing all doors of the vehicle.
10. A method for adaptively actuating a vehicle locking system for locking the doors of a vehicle, the method comprising the steps of:
- activating a lock request while at least one door of the vehicle is open;
 - 5 closing all doors of the vehicle;
 - starting countdown of a delay timer from a first predetermined time stored in memory in response to the step of closing all doors;
 - delaying locking of doors of the vehicle for at least the first predetermined time;
 - 10 resetting the delay timer to a second delay time greater than the first predetermined time by a first incremental time in response to a door being opened when the amount of time left on the delay timer is less than a predetermined fraction of the first predetermined time but is greater than zero;
 - 15 resetting the delay timer to a third delay time less than the first predetermined time by a second incremental time in response to a door being opened when the amount of time left on the delay timer is greater than a predetermined fraction of the first predetermined time;
 - thereafter delaying locking of doors of the vehicle for at least the
 - 20 second delay time or the third delay time; and
 - locking all doors if a door is not opened before the second delay time or the third delay time expires.

11. The method of claim 10 further comprising the step of storing in the memory the identity of the door opened and the second delay time or the third delay time in place of the first predetermined time.

12. The method of claim 10 further comprising the step of adding a third incremental time to either the second delay time or the third delay time if the door remains open for a time greater than a predetermined delay.

13. The method of claim 10 further comprising the step of adding a fourth incremental time to the first predetermined time if more than a predetermined number of doors are open or more than a predetermined number of door transitions occur before the step of activating a lock request.

14. A method for adaptively actuating a vehicle locking system for locking the doors of a vehicle, the method comprising the steps of:

- providing a control module comprising a delay timer and a memory, the memory configured to store door opening/closing history,
- 5 including sequence of door openings, times taken for door openings and time delays associated with door openings;
- activating a lock request while at least one door of the vehicle is open;
- closing all doors of the vehicle;
- 10 accessing the memory to determine whether a door opening/closing history exists;
- setting the delay timer to a first predetermined delay time comprising a time retrieved from the memory if a door opening/closing history exists or to a preset time if no door opening/closing history exists;
- 15 starting countdown of the delay timer from the first predetermined delay time;

delaying locking of doors of the vehicle for at least a time equal to the first predetermined delay time;

opening a first door after the step of starting countdown;

20 resetting the delay timer to a second delay time stored in the memory if the door opening/closing history includes a history beginning with opening the first door or to a third delay time if there is no door opening/closing history beginning with opening the first door, the second or third delay time calculated in response to the fraction of the first
25 predetermined delay time remaining when the first door is opened;

 closing the first door and modifying the door opening/closing history to reflect the reset delay time; and

 locking all doors if a door is not opened before the delay counter counts to zero.

15. The method of claim 14 further comprising the steps of:

opening a second door before the delay counter counts to zero;

 resetting the delay timer to a fourth delay time stored in memory if the door opening/closing history begins with opening the first door and
5 then the second door or to a fifth delay time if there is no such door opening/closing history, the fourth or fifth delay times calculated in response to the fraction of the second or third delay times remaining when the second door is opened; and

 closing the second door and modifying the door opening/closing
10 history to reflect the reset fourth or fifth delay time.

16. The method of claim 14 wherein the step of activating a lock request comprises a step selected from the group consisting of: turning a key in a lock and depressing a button on a wireless transmitter.

17. The method of claim 16 wherein the steps of turning a key or depressing a button comprise turning a key personalized to a particular

individual or depressing a button on a wireless transmitter that is personalized to a particular individual.

18. The method of claim 17 wherein the step of providing a control module comprises the step of providing a control module comprising a memory configured to store door opening/closing history personalized to a particular individual and wherein the step of modifying the door
5 opening/closing history comprises the step of modifying the door opening/closing history personalized to a particular individual in response to activating a lock request by turning a key personalized to a particular individual or depressing a button on a wireless transmitter that is personalized to a particular individual.

19. An adaptive vehicle locking system comprising:
a control module comprising:
a memory configured to store a history of door openings and closings; and
5 an adaptive delay timer configured to count down from an adaptive delay time in response to the stored history;
a plurality of sensors configured to sense door openings and closings and to send signals responsive to door openings and closings to the control module to update the history stored in the memory;
10 a plurality of door locks coupled to the control module and lockable in response to a signal from the control module following a lock request and completion of count down by the delay timer.

20. The system of claim 19 wherein the delay timer is further configured to be reset to a further adaptive delay time in response to opening of a vehicle door.